Characterization of neuromorphic response using a conductive atomic force microscope

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ABSTRACT

Neuromorphic and brain-inspired computing is attracting huge attention among academics and companies due to its potential to process and store large amount of data in parallel and consuming very little energy [1]. A wide number of devices, including transistors, memristors and memtransistors (among others) are being investigated as building blocks of integrated circuits producing different types of neuromorphic responses. However, often such studies are being carried out in large devices with lateral sizes >10^{-4} μm^2 [2-4]. Moreover, in many cases the electronic response is not produced in a homogeneous manner, i.e. it is only produced by specific locations within the device [5]. In this presentation I will show how the origin and quality of neuromorphic response can be explored in situ and at the nanoscale using a standard conductive atomic force microscope. This novel methodology is relevant for researchers investigating the nanoelectronic properties of materials, as well as designers of neuromorphic and/or brain-inspired circuits.

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